

HUMAN BEHAVIOUR RECOGNITION, IDENTIFICATION, AND COMPUTER INTERACTION

Edited by

Othman Omran Khalifa, B.Sc., M.Sc., Ph.D.,
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Chapter 18

HUMAN PATH CLASSIFIER ARCHITECTURE

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18.1. Introduction

Many surveillance systems today provide only a passive form of site monitoring. Extensive video records may be kept to help find the instigator of criminal activities after the crime has been committed but preventive measures require human involvement. In addition, there is a need for large amounts of data storage to keep up to several large volumes of video streams that may be needed for later analysis. However, monitoring and storage space are not the only concerns. Behavioral analysis itself can be applied to numerous features extracted from video sequences including path detection and other aspects of human behaviour. Up till now, path classification has been carried out mainly using Boolean logic and allows only the identification of unusual paths, and not the extent to which they are deviant from usual paths. This chapter reports on the results to solve this problem with a fuzzy inference approach to classify paths into different categories.

The fuzzy inference system is first setup for a training period that will study (over a period of time) the usual paths taken by people in a scene. After this training period, the system will identify common routes which are used by people in the scene. These routes will be defined by entry and exit points and a route envelope (at the extremes of the route). Once the system has created these routes, it will be able to monitor individuals whose path deviates from these routes and detect this deviation as an event. The system uses a number of similarity measures to identify different characteristics of the deviation. It is these similarity measures that are then fuzzified and passed through a fuzzy rule base to classify the deviation as 'suspicious', 'dangerous', 'acceptable', 'urgent', etc. This flow of this entire algorithm is shown in figure 18.1 below: